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Comprehensive Report on the Corporation of the Town of Georgetown

1972

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COMPREHENSIVE REPORT

ON THE

CORPORATION OF THE TOWN OF GEORGETOWN

1972

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Sanitary Engineering Branch

Regional Engineers Section

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1.0 SUMMARY

The water supply for the Town of Georgetown is more than adequate to meet present demands. Well capacity is 6.63 MIGPD and the maximum daily pumpage in 1972 was 2.727 MIGPD. The reserve well capacity could accommodate an additional 23,900 persons at the present rate of demand. This figure would of course be altered accordingly as water using industries locate in the community.

The situation at the water pollution control plant is much less encouraging. The collector system is prone to infiltration and the plant has been hydraulically overloaded for some time. Even without increasing hydraulic capacity other improvements to the plant are required. The town has made application for the expansion of the plant, however, no schedule of activity has been set. Several subdivision applications have been labelled premature until the plant expansion is started. These subdivision proposals will require almost double the present plant capacity. Water quality criteria dictate that the sewage treatment plant will not be able to expand above 3.0 MIGD with current methods of treatment and still maintain a water quality for downstream recreational use such as fishing, etc.

The water pollution survey indicates that the local streams, considering the urban character of some of the watershed area, have a reasonable water quality. Silver Creek was cluttered in places with natural debris; however, the only bacteriological counts found higher than expected were downstream from the sewage treatment plant. The August sampling run coincided with a chlorinator breakdown at the plant. The problem was promptly taken care of and the

follow-up samples showed the downstream quality to be much improved. Black Creek and the Credit River showed no visible signs of having been adversely affected. Samples collected found the water quality to be satisfactory as indicated above.

Of all the outfalls located and sampled, only one was brought to the attention of the Town for investigation.

2.0 INTRODUCTION

This report on the status of water pollution control in the Town of Georgetown is the result of field work done between May and September 1972. Included are discussions on the performance of the sewage treatment plant, the capabilities of the water supply and the stream and outfall survey of the watercourses within the Town.

The report also discusses future plans for the sewage treatment plant and its collector system and development in the Town.

The information received from Messrs. J. E. Willis, Town Engineer and R. K. Faulkner, Water Commission Manager is appreciated.

3.0 GENERAL

The Town of Georgetown with a population of some 17,000 persons lies in the Credit River Watershed with Silver Creek, the major watercourse flowing in a general west to east direction through the community. Storm drainage empties primarily into Silver Creek.

Almost all residences are connected to both the water and sewage services with only the odd case of septic tank systems and private wells.

4.0 MUNICIPAL WATER WORKS

4.1 General

The water supply for the Town of Georgetown consists of six drilled wells. Four of these are on the Maple Street aquifer while the other two are on the Princess Anne Drive aquifer. A total of one million Imperial gallons of storage is provided along with the 6.63 MIGPD well capacity.

The water in the Maple Street aquifer frequently has a higher than recommended concentration of iron. For the removal of iron, filters are located in the pumping station. Other treatment provided is chlorination and fluoridation.

4.2 Water Works Capacity

Pumping tests for the wells are done by International Water Supply. The latest available data in the Town records is presented in the following table.

WELL	SAFE CAPACITY	PUMP CAPACITY	ODOUR	STANDBY POWER
#1	350 IGPM	600 IGPM	Yes	20 HP
#2	250 IGPM	700 IGPM	Yes	40 HP
#3	400 IGPM	840 IGPM	No	40 HP
#4	900 IGPM	1000 IGPM	No	50 HP
#5	700 IGPM	700 IGPM	No	70 HP
TOTAL	2600 IGPM = 3.75 MIGPD			

Well #6 was being constructed during the initial inspection on May 24, 1972. The date of completion was scheduled for June 8, 1972, however it did not see service until July 27, 1972. Well #6 is in the same aquifer as Well #5 and has been

given a safe pumping capacity of 2.88 MIGPD with Well #5 operating. The current water demands do not require the new well to be used regularly and it is considered as a standby supply.

The high lift capacity at the Maple Street pumphouse is 5.0 MIGPD provided by 3 electric pumps. A diesel auxiliary unit will pump at the rate of 2.1 MIGPD from the wet well storage tank. Wells #1 and #2 both have auxiliary power which would put 600 IGPM into the water plant during a power failure. Well #6 also has diesel power to maintain its capacity during a power failure. With the auxiliary power available a pumping rate of 3.74 MIGPD can be maintained which is sufficient to handle present demands.

4.3 Storage

The 500,000 Imperial gallon reservoir at the Maple St. pumping station is also used as a wet well for the high lift pumps. The 500,000 Imperial gallon elevated tank on Mountview Road rides on the distribution system with its level being controlled by telemetry from the pumping station. The tank is full at 38.5 feet. At 36 feet one of the high lift pumps starts and at 34 feet a second pump starts. Both tanks were last cleaned in 1968.

4.4 Pumpage

During 1971, the total pumpage was 559,298,000 gallons. The average daily pumpage was 1,532,323 Imperial gallons. The maximum day pumpage occurred in June with 2,755,000 Imperial gallons while the minimum day pumpage of 741,000 Imperial gallons was recorded in October.

During the first nine months of 1972 the pumpage was 427,192,000 gallons. This is an increase of only 620,000 Imp. gallons over the same period in

1971. The average daily pumpage for this period was 1,559,094 Imperial gallons. The maximum daily pumpage was 2,727,000 Imperial gallons and the minimum daily pumpage was 848,000 Imperial gallons.

The use of pumped water is broken down in the following table.

INDUSTRY	TOTAL CONSUMPTION 1971
Standard Products	12,050,000 Imp. gals.
General Fireproofing	17,123,000 Imp. gals.
Presstite Division	7,125,000 Imp. gals.
Varian & Associates	13,356,000 Imp. gals.
Meadowglen Mushrooms	4,800,000 Imp. gals.
Smith & Stone Limited	94,356,000 Imp. gals.
Domtar Fine Papers	19,314,000 Imp. gals.
Provincial Paper	42,768,000 Imp. gals.
Other industries	12,108,000 Imp. gals.
TOTAL	223,000,000 Imp. gals.

Average Daily Industrial Consumption	- 610,958 Imp. gals.
Water Used Commercially	- 44,000,000 Imp. gals./year or daily average of 120,547 gallons
Domestic Usage	- 215,000,000 Imp. gals./year or daily average of 589,041 Imp. gals.
Water Not Accounted For (ie. firefighting, main flushing,etc.)	- 77,000,000 Imp. gals./yr. or a daily average of 210,958 (16% of average daily pumpage)

The population served in 1971 was 16,750. A per capita consumption on a domestic usage basis only is 35.3 Imp. gallons. When the industrial

commercial and unaccounted uses are included the per capita consumption jumps to 91.6 Imp. gallons on an average day. The maximum day per capita consumption was 164 Imp. gallons while in the first 9 months of 1972, the maximum per capita usage was 161 Imp. gallons.

The large quantity of water that is unaccounted for could probably be reduced somewhat by practising main swabbing rather than main flushing to clean out the water mains. Swabbing is much more effective in that it definitely removes all sediments or other debris which tends to provide an area for protection from chlorination and hence allowing multiplication of bacteria. Swabbing demonstrations were done in several locations throughout Ontario some years ago, and all municipalities were invited to attend. It is strongly recommended that the town adopt a program of main swabbing which may as mentioned before reduce lost water.

4.5 Reserve Capacity

The water supply for the Town can produce 6.63 MIGPD. The maximum recorded pumpage in 1972 was 2,727,000 Imperial gallons per day. The reserve capacity would be 3.90 MIGPD, enough for an equivalent population of 24,220 based on a maximum daily consumption of 161 Imp. gals./person. Alterations to these figures will be required as water using industries situate in the Town.

During the initial inspection some 80 homes were under construction which would account for approximately 320 persons if a figure of 4 persons/dwelling is used.

This would leave enough reserve capacity to accommodate 23,900 persons, which is sufficient to serve the growth expected after completion of the sewage treatment plant expansion.

4.6 Treatment

Wells #1, #2, #3 and #4 receive disinfection, iron removal and fluoridation at the Maple Street pumphouse. Wells #5 and #6 each have their own separate chlorine and fluoride addition equipment in the Princess Anne Drive pumphouse.

Disinfection in all cases is by gas chlorination. During 1971, 1808 pounds of chlorine were used for an average dosage of 0.3 ppm. The chlorine residual during the plant inspection was a satisfactory 0.35 mg/l after 15 minutes contact time. Consistently satisfactory bacteriological sample results indicate that the disinfection is satisfactory.

Iron removal was started on May 17, 1967. The process uses the Graver water conditioning monoscour filters. The filters consist of two units each with two chambers giving four series sand and anthrafilt filters. The filtering is done in two stages with roughing through the anthrafilt and polishing with a torpedo sand (a commercial name for the fine filter media).

On the occasion of the inspection of the water works none of the wells had an iron count in excess of the recommended limit of 0.3 mg/l. Past sample results show that iron content varies in each well and that the filters have provided a continuous flow of satisfactory water.

The filters are normally backwashed twice each week. With the construction of Well #6 going on at the time of the inspection, it was necessary to backwash daily.

Washwater is put into a concrete holding basin outside the plant to settle. The clear water is then allowed to flow into Silver Creek.

The Town started its fluoridation program on April 4, 1972. Hydrofluosilicic acid with 25% by weight available fluorine is used. Plant records show that the fluoride concentration has been consistently 1.0 or 1.1 mg/l since the time of installation. The optimum dosage is considered to be 1.0 mg/l. On the day of the water works inspection, the fluoride concentration was 1.1 mg/l which was satisfactory.

4.7 Sampling Program

The present bacteriological sampling program consists of 24 samples per month. The wells, along with a few key points, are sampled every two weeks. In 1971 only one sample indicated unsatisfactory quality and immediate resampling indicated zero coliforms.

The Halton County Health Unit collected an additional 148 bacteriological samples in 1971. Of these only three samples indicated adverse quality. The present rate of collecing samples has proved to be adequate in monitoring water quality and should be continued.

Since the installation of the fluoride addition equipment, regular chemical samples have been submitted for fluoride analysis.

4.8 Heavy Metals

The water in the distribution system was analyzed for heavy metals. None of the metals listed in Table VI are of sufficient concentration to be a problem.

4.9 Distribution System

The entire population of Georgetown with the exception of a very few isolated cases is served by the water system. The length and sizes of water mains in use are listed in the following chart.

1/2" pipe	-	2,500 feet	- 0.47 miles
3/4" pipe	-	550 feet	- 0.10 miles
1" pipe	-	4,120 feet	- 0.78 miles
2" pipe	-	3,550 feet	- 0.67 miles
4" pipe	-	31,560 feet	- 5.98 miles
6" pipe	-	124,390 feet	- 23.56 miles
8" pipe	-	44,800 feet	- 8.84 miles
10" pipe	-	18,690 feet	- 3.54 miles
12" pipe	-	5,080 feet	- 0.96 miles
16" pipe	-	5,250 feet	- 0.99 miles
20" pipe	-	2,150 feet	- 0.41 miles

5.0 WATER POLLUTION CONTROL PLANT

5.1 General

The present water pollution control plant serving the Town of Georgetown was put into use in April of 1961. The plant is operated by the Project Operations Branch of the Ministry of the Environment and treats sewage from virtually all the developed areas of the Town only a few homes being on septic tank systems.

Treatment provided is communition, grit removal, primary settling, aeration, final settling, two stage digestion and chlorination. The plant effluent is discharged to Silver Creek.

5.2 Plant Capacity

The original plant design provided for treatment of an average day dry weather flow of 1.5 MIGPD. The individual component capacities of the plant are listed in Appendix IV. The average daily flows for the past few years are presented below. The average flows have been greater than the design capacity in three of the six years listed and 1972 average daily flows are also expected to remain above the plant capacity.

YEAR	AVERAGE DAILY FLOW (Imp. Gal.)
1966	995,808
1967	2,131,508
1968	1,477,863
1969	1,309,041
1970	1,634,794
1971	1,513,397

During 1971, a total flow of 552,390,000 Imperial gallons was recorded at the plant. The average daily flow as listed above was 1,513,397 Imp. gals./day and with a population of 16,750, the per capita flow would be 90 gallons. The maximum daily flow recorded in 1971 was 3,200,000 gallons which is over twice the design capacity.

5.3 Plant Expansion

The extension of the water pollution control plant has been under consideration since 1968. The Town Council agreed in June of this year to go ahead with an expansion program. The plans will include facilities for phosphorus removal.

Council has decided that the plant should expand to 3.0 MGD. Current subdivision proposals will require a plant expansion of 1.5 MIGD, if all proposals are to proceed.

Past recommendations have stated that, even without expansion the following requirements should be met; facilities to by-pass the secondary section of the plant, an enlarged chlorine contact chamber, the above mentioned phosphorus removal facilities, and an enlargement of the raw sewage pumping station.

Past experience has found that the plant cannot take a peak flow greater than approximately 3.0 MGD. This was quite evident during the spring runoff of 1971 when the peak flows washed out the solids from the aeration tanks and resulted in the loss of secondary treatment for a short while.

Flow through the plant is limited to 3.0 MGD and flows above this are not accepted. The excess sewage backs up in the trunk sewer to a man-hole near

the plant where it spills out and runs to Silver Creek. Had these recommendations outlined above and sent to the town in 1971, been carried out, all the sewage would receive at least primary treatment and chlorination. The plant expansion should include repair of this upstream man-hole to eliminate bypassing of raw unchlorinated sewage to Silver Creek.

5.4 Plant Loading

The original plant design provided for treatment at an average day dry weather flow of 1.5 MIGPD for 15,000 persons. The design BOD loading was set at 200 mg/l or 3,000 lbs./day. The design suspended solids loading was also 200 mg/l or 3,000 lbs./day.

Tables 1 and 2 appended to this report list the plant flows for 1971 and the first four months of 1972. The 1972 flows stop at four months due to the flow meter being out for repairs from mid-May to mid-September. A summary of these tables are presented here.

	1971	1972 (4 months)
Total Flow	552,390,000	193,750,000
Maximum Day	3,200,000	2,490,000
Maximum Rate	4,500,000	3,300,000
Average Day	1,513,397	1,601,239
% Average Day of Design Flow	101%	107%

The 48-hour continuous sampling done during the inspection at the treatment plant found the raw sewage to be quite weak. The average BOD and suspended solids concentrations were 97 mg/l and 92 mg/l respectively. The flow during this period had to be estimated using the Parshall flume in the intake well.

The flow over the 48-hour period was approximately 2.0 MIGD or 133% of design flow. The BOD and suspended solids loadings were 1,940 lbs. (65% of design loading) and 1,840 lbs. (61% of design loading) respectively.

The two major industries discharging to the sanitary sewers, Abitibi Provincial Paper and Domtar Fine Papers account for approximately 100,000 IGPD of wastewater flow per day. The strength of these effluents, (Abitibi's average 32 lb. BOD per day and Domtar at 120 lbs. per day) is such that they could not be considered as a diluting factor.

Infiltration is a definite problem with the collector system. The plant received high flows after rain storms. The peak flow rate in 1971 was 4.5 IMGD. This is discussed in more detail in the following section.

The raw sewage BOD and suspended solids sample results for 1971 and 1972 are shown in Appendix VI. The averages for BoD and suspended solids in 1971 were 105 and 177 mg/l respectively, while the average daily flow was 1,513,397 IG. Loading figures for 1971 are 1,590 lbs. and 2,680 lbs. for BOD and suspended solids respectively. For 1972 (four months), the average daily flow was 1,601,239 IG and the BOD and suspended solids loadings were 2,550 lbs. and 3,400 lbs. respectively. The substantial increase in BOD loading in 1972 is not parallelled by any significant growth in the town. This would indicate the need for regular 24 hour composite samplings to get a truer picture of the plant loading.

The allowable BOD loading to Silver Creek is 300 lbs./day. In 1971, the final effluent was putting out an average of 348 lbs. of BOD daily while during the four month period in 1972 the loading was 544 lbs. BOD.

5.5 Collection System

The majority of sanitary sewers in the town have been in use for a long time. The old trunk sewer followed the flood plain of Silver Creek for quite a distance and crossed the creek several times on its way to the old sewage treatment plant. This sewer, in use until the spring of 1972, has been eliminated and others like it will be replaced in the town's three phase plan of sewer redevelopment.

Phase I, the area east of Maple Avenue to the treatment plant, was completed some time ago. Phase II was completed in June of this year with new collectors and trunks to reduce eleven previous stream crossings to two. This area is bounded by Maple Avenue and Water Street on the east and south and the CNR tracks and John Street on the north. Phase III is planned for the future and will involve new sewers in the Ewing Street, Ontario Street and Princess Anne Drive area. Capacity in the trunk sewers will be provided for the future servicing of the Glen Williams area and other parts of Esquesing Township north of the town limits.

It was hoped that the completion of Phase II of this redevelopment program would reduce the infiltration problems being experienced. Unfortunately the flow meter was out of operation at the time the new sewers went into use; however, no significant reduction of dry weather flow was reported by the sewage plant operator.

With infiltration coming from ground water and storm flow being blamed for the weak raw sewage, the water works pumpages and the sewage plant flows were compared. In the first four months in 1971, the sewage flow was far greater than the water pumped. The largest difference occurred in March at approximately 8.3 million gallons. After the spring runoff the sewage flow dropped off considerably and the water pumpage increased. The ground water is a definite source of infiltration. Mr. Willis stated that on the occasion of repairing a relatively short length of sewer, numerous leaks had to be sealed. Ground water infiltration of parts of

the storm sewer system was evident in the outfall survey. A number of outfalls were discharging clear cold water more than a week after the last rainfall.

In April of 1972, the sewage flow was 17.7 million gallons over the water pumped for that month. The differences would not be compared for the summer of 1972 due to the flow meter failure. In September, when the repaired flow meter was installed, Mr. W. Smith, Chief Plant Operator, pointed out that the flow charts showed the flow rate still increases rapidly during a storm. Infiltration will remain a problem in the collector system until repairs to the old pipe are made and the redevelopment work is finished.

5.6 Pumping Stations

The gravity flow of sewage to the treatment plant is augmented by three pumping stations. The Moore Park and John Street pumping stations are under municipal jurisdiction while the Armstrong Avenue pumping station is maintained by the Ministry of the Environment staff from the treatment plant. Physical descriptions of the pumping stations appear in Appendix V.

The Moore Park station serves the west corner of town north of the CNR tracks. The John Street station serves small portions of Mountainview Road, River Drive and John Street itself. The Armstrong Avenue pumping station serves the industrial community along Armstrong Avenue, Todd Road and part of Sinclair Avenue.

6.0 NEW DEVELOPMENT

With the hydraulic capacity at the sewage plant used up and as yet no contracts let for expansion, subdivision proposals have been labelled as premature since 1970. At that time there were 250 serviced lots in the town and one active subdivision - Nell Subdivision - T-20790 - 120 lots. These accounted for approximately 1,400 persons. The population of Georgetown in 1970 was 15,943 and is now 17,000 in 1972. As mentioned earlier, 80 lots had homes under construction this summer. The following list contains the subdivisions submitted since 1970.

T-NUMBER	MUNICIPALITY	DESCRIPTION	DATE SUBMITTED	ESTIMATED POPULATION
T-20648	Esquesing	Roster Const.	Apr. 70	3,340
T-20647	Esquesing	Roster Cons.	Apr. 70	1,580
T-21462	Georgetown	Brumac	Dec. 70	2,470
T-21461	Georgetown	Brumac	Dec. 70	4,600
T-21460	Georgetown	Brumac	Dec. 70	1,980
T-22041	Esquesing	Lot 20, Conc. 8	June 71	35
T-22042	Esquesing	Lot 20, Conc. 8	June 71	720
T-22043	Esquesing	Lot 20, Conc. 8	June 71	35
24CDM-223	Georgetown	Golden Gate Const.	Oct. 71	140
	TOTAL POPULATION			13,550

The above population figures are based on an estimate of 4 persons per family unit. The capacity of the water works is more than able to satisfy this development. If all the above developments are to proceed

then a plant expansion of some 1.5 MIGD would be needed. Expansion of less than 1.5 IMGD would be used up quite rapidly especially since the town also has a serviced industrial subdivision with room left in it for several more industries.

7.0 INDUSTRIAL WASTE

7.1 Smith & Stone Limited

Smith & Stone Limited is the largest water using industry in Georgetown at 360,000 Imperial gallons per day. The company produces plastic products, ceramics and metal electrical components.

Most of the water is used for cooling. Two sources of contaminated wastewater are washwater from the spray enamelling in the ceramic section and a small amount of rinsewater from the acid bright dipping operations used for small stamped metal parts. Enamelling wastes are settled in a series of three sumps prior to discharge. Wastewater from the dipping operation is added to the waste cooling water and is sufficiently diluted to not cause any pH problems. The water is then discharged through a storm sewer to Silver Creek.

7.2 Provincial Paper Limited

This company uses approximately 164,000 Imperial gallons per day. Waste and washwater from the coating preparation rooms and paper coating machines are collected in a surge tank. The wastewater is pumped continuously from this tank to a cyclator clarifier which removes the solid material. The liquid is drained to a sanitary sewer along with cooling water and sanitary wastes and the solids are removed to holding tanks and then trucked away for disposal.

7.3 Domtar Fine Papers

The Domtar plant has an average daily waste flow of approximately 75,000 Imperial gallons. The only operation done at this mill is paper coating and the only wastewaters are from the washing up of machinery and other equipment.

All wastewater drains into two series lagoons. The first pond retains water

for 3 1/2 to 4 days and the second pond has retention time of 1 day. Lime is added to the wastewater before it enters the first pond in order to raise the pH to 9 or 10 and eliminate an odour problem.

Between the two ponds, alum is added to lower the pH and assist in settling solids. On occasions, it is necessary to remove some of the settled solids from the pond and this material is pumped to a sludge drying pond beside the two settling ponds. The effluent from the second settling pond is directed to the sanitary sewer.

7.4 Meadowglen Mushrooms Growers Limited

This operation is involved with the complete mushroom process from growing to canning. During 1971, Meadowglen used approximately 18,000 Imperial gallons of water per day.

Wastewater from the cannery is directed to the sanitary sewer. Wastes from the mushroom growing barn are drained to a lagoon on the property and the lagoon contents are used for irrigation. The Industrial Wastes Branch of the Ministry of the Environment indicated that the lagoon operation was satisfactory as of their last inspection.

7.5 Varian and Associates of Canada Limited

This company produces electronic devices. The average working day consumption of water in 1971 was approximately 51,000 Imperial gallons. The major uses of water are the cooling of the heat treatment furnaces and testing equipment and for air-conditioning. Rinses from the plating shop are also a source of wastewater. Sanitary wastes are put into the sanitary

sewer while all other water is discharged to a storm sewer. Sampling of the storm sewer found the water to be of satisfactory quality for discharge to a watercourse.

8.0 WATER POLLUTION SURVEY

The watercourses within the Town of Georgetown were surveyed in order to evaluate their conditions and to locate sources or possible sources of water pollution. The survey was looked at in two parts; a stream survey and an outfall survey.

8.1 Stream Survey

Georgetown has three major watercourses within or on its boundaries. These are Silver Creek, Black Creek and the Credit River. Points located at intervals along the watercourses were sampled at least twice for the purpose of this report. All sampling points except Point B on August 21 showed the water to be of satisfactory quality for streams in urban areas. Sample Point B was Silver Creek downstream from a watercourse that collects the flow and four storm sewer outfalls in the Delrex Subdivision area.

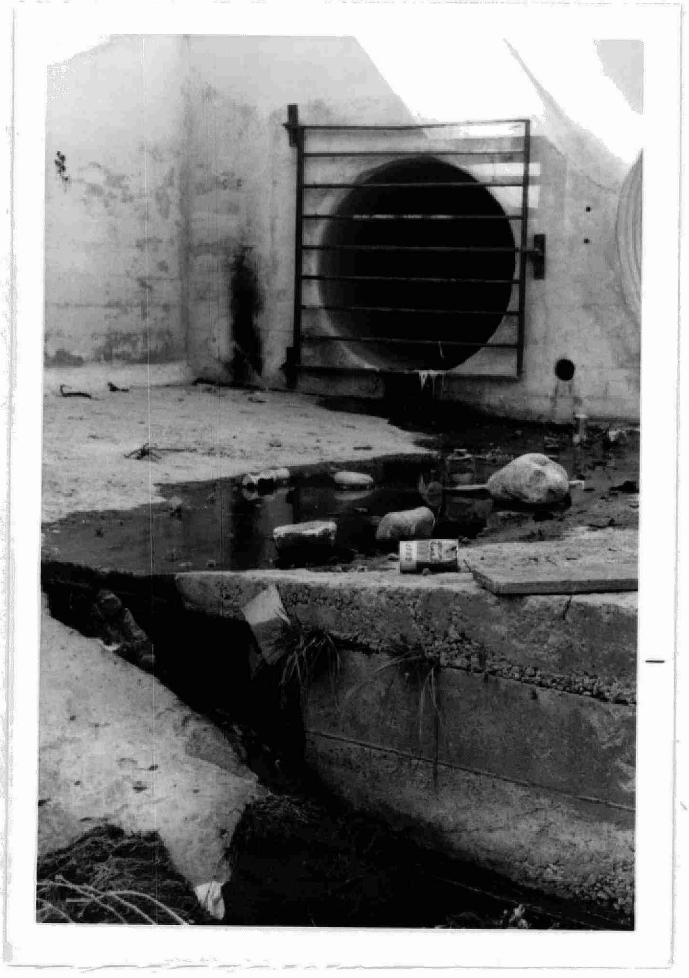
The only significant problem found with the watercourses was one of aesthetics.

Silver Creek downstream from Guelph Street

As the photo illustrates the creek is cluttered with debris. It would not take much effort to remove the debris occasionally to prevent these situations.

8.2 Outfall Survey

During the course of the stream survey, a total of 37 outfalls were located and sampled where possible. Each outfall was sampled at least twice and those of questionable quality were sampled a third time. The meteorological data in Appendix III indicates the effluents sampled could be considered dry weather flow.



Flow - 1 gpm dry weather

Total Coliforms - Sept.- 11,600
Aug.- 7,500,000

Fecal Coliforms - Sept. - 4,900
Aug. - 100,000

SS-9 42" Concrete Pipe

The majority of outfalls were of acceptable quality. Three sampling points were found to be unsatisfactory. They are designated SS-3, SS-9 and SS-12. SS-9 which drains a good portion of the Delrex Boulevard and surrounding areas proved to be the most questionable outfall. The town was notified by letter regarding the locations of these sampling points.

Prepared by: W.D. Maitland

W.D. Maitland, Technologist
District Engineers Section
Sanitary Engineering Branch

APPENDIX I

TOWN OF GEORGETOWN

STREAM SURVEY

SAMPLING POINTS

SAMPLE NUMBER	DESCRIPTION
A	Silver Creek below sewage treatment plant
B	Silver Creek above sewage treatment plant
C	Silver Creek at Mountainview Road
D	Silver Creek at end of Noble Court
E	Silver Creek at Maple Street
F	Silver Creek at Guelph Street
G	Silver Creek at John Street West
H	Silver Creek at Elm Street
I	Silver Creek at Ontario Street
J	Silver Creek at stone bridge north of Town limit
K	Black Creek at Main Street
L	Credit River at Glen Williams
M	Credit River at River Street

APPENDIX II

TOWN OF GEORGETOWN

OUTFALL SURVEY - SAMPLING POINTS

SAMPLE NUMBER	DESCRIPTION
SS-1	30-inch concrete pipe outfall from Rosefield Drive
SS-1A	Outfall from Georgetown sewage treatment plant
SS-2	36-inch concrete pipe from Fagan Drive and Delrex Boulevard
SS-3	21-inch concrete pipe of Chelvin Drive
SS-4	18-inch concrete pipe of Regan Crescent
SS-5	60-inch concrete pipe off Delrex Boulevard
SS-6	42-inch corrugated metal pipe (CMP) between Regan Crescent and Delrex Boulevard
SS-7	12-inch concrete pipe off end of Metcalfe Court
SS-8	15-inch concrete pipe off end of Danridge Crescent
SS-9	42-inch concrete pipe from Delrex Boulevard east of Metcalfe Court
SS-10	60-inch CMP
SS-11	24-inch concrete pipe on Mountainview Road north and east of the Silver Creek bridge
SS-12	24-inch concrete pipe from Stockman Crescent
SS-13	30-inch concrete pipe from Rexway Drive
SS-14	24-inch concrete pipe at bottom of Noble Court
SS-15	24-inch concrete pipe below Tyers Avenue between Edwards Street and Carol Street
SS-16	Drain from iron settling basin at Georgetown water works
SS-17	12-inch concrete pipe from Maple Avenue
SS-18	Drainage course 150 feet west from Maple Avenue at Main Street
SS-19	12-inch asbestos pipe behind high school
SS-20	Stream on west side of Silver Creek, 100 feet downstream from Guelph Street
SS-21	12-inch concrete pipe at the south-east corner of Guelph Street bridge

SS-22	12-inch asbestos pipe at south-west corner of Guelph Street bridge
SS-23	6-inch asbestos pipe at north-east corner of Guelph Street bridge
SS-24	8-inch concrete pipe at north-west corner of Guelph Street bridge
SS-25	24-inch concrete pipe at end of Emery Street
SS-26	Pipe not located as indicated on Town storm sewer map
SS-27	12-inch concrete pipe at end of John Street
SS-28	24-inch concrete pipe west side of creek just north of CNR tracks
SS-29	12-inch concrete pipe at end of College Street
SS-30	24-inch concrete outfall used at Elm Street
SS-31	16-inch concrete pipe west of Elm Street
SS-32	Small drainage course crossing Ontario Street west of Riverview Court
SS-33	14-inch concrete pipe at Anne Street
SS-34	30-inch concrete pipe located where Silver Creek enters Georgetown
SS-35	30-inch CMP beside SS-34
SS-36	Drainage course through 36-inch culvert to the Credit River at River Street
SS-37	8-inch cast iron pipe beside SS-36

APPENDIX III

METEOROLOGICAL DATA

DATE	RAIN	HIGH TEMPERATURE	LOW TEMPERATURE
May 23	nil	80	45
May 24	nil	79	50
May 25	nil	72	45
May 26	nil	71	42
June 5	nil	69	45
June 6	trace	72	47
June 17	nil	66	44
June 18	nil	74	40
June 19	nil	79	51
August 20	nil	90	67
August 21	nil	87	64
August 23	0.04 inches	90	64
August 24	0.01 inches	86	60
September 19	trace	80	68

APPENDIX IV

WATER POLLUTION CONTROL PLANT

PHYSICAL DETAILS

PRIMARY TREATMENT

Screening

Type	-	manually cleaned bar screen
Size	-	3/4-inch spacing

Communition

Type	-	C.P. barminutor, Model C
Size	-	24-inch

Sewage Lift Pumps

Type	-	Chicago Pump
Size	-	Two - 2,900 gpm at 60' head

Grit Removal

Type	-	Dorr type WA detritor
Size	-	One - 12' x 12' x 1'-3" (1,120 gal.)
Retention	-	1.1 minutes

Primary Sedimentation

Type	-	Dorr type A
Size	-	Two - 35' x 35' x 10' SWD (24,500 cu. ft. or 153,000 gallons)
Retention	-	2.5 hours
Loading	-	surface, 612 gals. per square foot per day weir, 5,360 gallons/lin. ft./day

SECONDARY TREATMENT

Aeration Tanks

Type	-	mechanical aeration; single path
Size	-	Two - 112' x 28' x 13.25' (79,400 cu. ft. or 495,000 gals.)
Retention	-	7.9 hours

Aerators

Number	-	8 - Ames Crosta - mechanical

Secondary Sedimentation

Type	-	Dorr Type AZ
Size	-	Two - 40' x 40' x 10' SWD (32,000 cu. ft. or 200,000 gals)

Retention	-	3.2 hours
Loading	-	surface, 470 gals./sq. ft./day weir, 4,700 gals./lin. ft./day

CHLORINATION

Number	-	1 - Wallace & Tiernan 200 lb./day

Chlorine Contact Chamber

Size	-	45' x 15' x 6' deep (27,000 gals.)

OUTFALL - to Silver Creek

SLUDGE HANDLING

Digestion System

Type	-	two stage
Primary		
Type	-	Dorr draft two mixers (3) on fixed steel roof
Size	-	one - 66' dia. x 22.6' deep (avg.) (77,800 cu. ft. or 485,000 gals.)
Loading	-	1.1 lb./cu. ft./mon.
Secondary		
Size	-	one - 34' x 34' x 16.25' (20,700 cu. ft. or 129,000 gals.)
Total Loading	-	087 lbs./cu. ft./mon.

DESIGN DATA

Project Number	-	2-0017-58
Design Flow	-	1.5 MGD
Treatment	-	activated sludge
BOD	-	raw sewage, 200 mg/l. removal - 95%
Suspended Solids	-	raw sewage, 200 mg/l. removal - 95%
Design Population	-	15,000 people

APPENDIX V

TOWN OF GEORGETOWN

SEWAGE PUMPING STATION DETAILS

ARMSTRONG AVENUE PUMPING STATION

Approval Number	-	61-8-77
Service Area	-	Armstrong Industrial Subdivision
Barminutor	-	Chicago Pump Company, Model B (18-inch)
Lift Pumps	-	one - 400 IGPM Smart Turner pump, 10 HP electric motor one - 700 IGPM Smart Turner pump, 20 HP electric motor Both pumps are float controlled
Wet Well	-	8,610 gallons

MOORE PARK PUMPING STATION

Approval Number	-	62-A-542
Service Area	-	67 acres, Moore Park Subdivision
Lift Pumps	-	two - Aurora Pumps, 300 IGPM at a head of 32 feet each two - 7.5 HP electric motors Both motors are float controlled
Discharge Capacity	-	550 IGPM or 1.34 cu. ft./sec.
Influent	-	10-inch dia.
Forcemain	-	8-inch dia.

JOHN STREET PUMPING STATION

Service Area	-	Michael Street, Caroline & Rosetta and parts of River Road
Lift Pumps	-	two - 550 IGPM pumps at 93' head two - 25 HP electric motors
Forcemain	-	10-inch dia.
Standby	-	diesel electric power
Wet Well	-	8' x 14' x 7' (to level of second pump intake) 783 sq. ft.

APPENDIX VI

TOWN OF GEORGETOWN

WATER SYSTEM DETAILS

WELLS

Well No. 1

Aquifer	-	Maple Street
Well Capacity	-	350 Imp. GPM
Pump	-	600 IGPM, powered by 20 HP electric motor, standby motor connected

Well No. 2

Aquifer	-	Maple Street
Well Capacity	-	250 Imp. GPM
Pump	-	700 IGPM, powered by 40 HP electric motor, standby motor connected

Well No. 3

Aquifer	-	Maple Street
Well Capacity	-	400 Imp. GPM
Pump	-	840 IGPM, powered by 40 HP electric motor, no standby

Well No. 4

Aquifer	-	Maple Street
Well Capacity	-	900 Imp. GPM, powered by 50 HP electric motor, no standby

Well No. 5

Aquifer	-	Princess Anne
Well Capacity	-	700 Imp. GPM
Pump	-	700 IGPM, powered by 70 HP electric motor
	-	no standby

Well No. 6

Aquifer	-	Princess Anne
Well Capacity	-	2000 Imp. GPM
Pump	-	2000 IGPM, powered by 200 HP electric motor, diesel standby connected

PUMPHOUSE

Iron Removal Filters

Type	-	Graver Water Conditioning mono scour filter process
Capacity	-	3 MIGD
Units	-	2 pressure tanks each with 2 chambers giving 4 series filters

Coarse Media	-	anthrafilt
Fine Media	-	Torpedo sand
Back Washing	-	Twice weekly
	-	effluent to settling basin
	-	discharge to Silver Creek

Chlorinators

Type	-	4 - Wallace & Tiernan gas chlorinators; one for regular use and one for standby at Maple Street pumphouse
	-	1 - each for Wells #5 and #6 at the Princess Anne Drive pumphouse

Fluoride

Type	-	Wallace & Tiernan at Maple Street pumphouse
	-	using hydrofluosilicic acid 25% fluoride
	-	also one each for Wells #5 and #6
Storage	-	500,000 Imp. gallon concrete inground reservoir, also used as wet well for high lift pump

High Lift Pumps

Pump No. 1

Type	-	De Laval Pump Co.
Capacity	-	980 IGPM @ 231' head
Motor	-	General Electric developing 75 HP at 1760 RPM
Serial No.	-	259763

Pump No. 2

Type	-	De Laval Pump Co.
Capacity	-	1260 IGPM @ 231' head
Motor	-	General Electric developing 100 HP at 1760 RPM
Serial No.	-	258830

Pump No. 3

Type	-	De Laval Pump Co.
	-	standby pump
Capacity	-	1450 IGPM @ 320' head
Motor	-	General Motors diesel, no HP rating available
Serial No.	-	259764

Pump No. 4

Type	-	De Laval Pump Co.
Capacity	-	1260 IGPM @ 230' head
Motor	-	General Electric developing, 100 HP at 1750 RPM

Elevated Storage

Location	-	Todd Avenue & Mountainview Road
Capacity	-	500,000 Imp. gallon elevated tank

Booster Pump

Location	-	Moore Park Cr. and Main Street
Capacity	-	not available
	-	boosts line pressure from 40 psi to 70 psi for the Moore Park Subdivision area

TABLE I

SAMPLE ANALYSES - STREAM SURVEY

SAMPLE PT. NO.	DATE SAMPLED	BOD (mg/l)	SUSP. SOLIDS (mg/l)	PHENOLS (ppb)	DISS. OXYGEN (mg/l)	TEMP. °C.	TOTAL COLIFORMS per 100 ml	FECAL COLIFORMS per 100 ml
A	26/5/72	3.5	10	2	-	-	160	70
	21/8/72	5.5	10	-	-	-	70	10
	20/9/72	1.0	5	2	-	-	1,040	280
B	26/5/72	1.6	10	2	-	-	90	60
	21/8/72	4.0	5	-	-	-	1,470,000	76,000
	20/9/72	1.2	10	4	-	-	1,030	150
C	26/5/72	1.4	10	4	14.4	19.5	136	36
	21/8/72	3.0	5	-	-	-	2,000	220
D	25/5/72	1.4	10	4	13.0	17.5	228	84
	21/8/72	2.5	5	-	-	-	600	80
E	25/5/72	0.8	30	4	11.0	19.0	1,400	165
	21/8/72	3.0	5	-	-	-	390	200
F	25/5/72	0.8	30	2	10.8	18.5	204	196
	24/8/72	1.4	20	-	-	-	4,900	280
G	25/5/72	0.8	30	4	11.0	18.5	292	144
	24/8/72	2.0	10	-	-	-	1,260	470
H	26/5/72	0.6	5	2	12.2	12.0	320	110
	24/8/72	2.4	10	-	-	-	990	760
I	26/5/72	0.4	5	4	12.0	12.0	110	50
	24/8/72	0.4	20	-	-	-	800	220

SAMPLE PT. NO.	DATE SAMPLED	BOD (mg/l)	SUSP. SOLIDS (mg/l)	PHENOLS (ppb)	DISS. OXYGEN (mg/l)	TEMP. °C.	TOTAL COLIFORMS per 100 ml	FECAL COLIFORMS per 100 ml
J	26/5/75	0.6	5	4	12.3	13	210	80
	24/8/72	0.8	10	-	-	-	1,690	200
K	25/5/72	1.4	10	2	14.0	19.0	76	32
	21/8/72	1.8	5	-	-	-	1,900	170
L	26/5/72	1.8	10	3	11.6	15.3	280	30
	24/8/72	1.2	5	-	-	-	250	120
M	26/5/72	1.6	5	3	13.3	15.5	150	70
	24/8/72	1.2	10	-	-	-	10	10

ppb = parts per billion

L = less than

TABLE II

SAMPLE ANALYSES - OUTFALL SURVEY

SAMPLE PT. NO.	DATE SAMPLED	BOD (mg/l)	SUSPENDED SOLIDS (mg/l)	PHENOLS (ppb)	TOTAL COLIFORMS per 100 ml	FECAL COLIFORMS per 100 ml
SS-1	June 19/72	0.6	10	2	5,700	20
	August 21/72	2.5	0	-	7,500	670
SS-1A	May 26/72	18.0	15	4	L 10	L 10
	August 21/72	5.0	5	-	4,000	430
	September 20/72	1.2	10	-	L 10	L 10
SS-2	June 19/72			N O F L O W		
	August 21/72			N O F L O W		
SS-3	June 19/72			N O F L O W		
	August 21/72	5.0	20	-	18,000	11,000
	September 20/72	1.2	10	4	23,000	L 10
SS-4	June 19/72			N O F L O W		
	August 21/72			N O F L O W		
SS-5	June 19/72	1.2	5	10	40	10
	August 21/72	2.5	0	-	440	10
SS-6	June 19/72	0.6	5	2	390	L 10
	August 21/72	1.6	5	-	2,700	430
SS-7	May 26/72			N O F L O W		
	August 21/72			N O F L O W		
SS-8	May 26/72			N O F L O W		
	August 21/72			N O F L O W		
SS-9	June 6/72	1.4	L 1	-	1,440	300
	August 21/72	6.5	0	-	7,500,000	100,000
	September 20/72	2.5	0	4	11,600	4,900

SAMPLE PT. NO.	DATE SAMPLED	BOD (mg/l)	SUSPENDED SOLIDS (mg/l)	PHENOLS (ppb)	TOTAL COLIFORM per 100 ml	FECAL COLIFORMS per 100 ml
SS-10	June 6/72	0.8	-	-	23,000	1,600
	August 21/72	8.0	0	-	4,500	40
SS-11	June 19/72	0.8	5	2	1,530	330
	August 21/72			NO FLOW		
SS-12	June 19/72			INSUFFICIENT FLOW		
	August 21/72	13.0	220	-	170,000	20,000
	September 20/72	3.0	20	3	3,800	10
SS-13	June 6/72			INSUFFICIENT FLOW		
	August 21/72			INSUFFICIENT FLOW		
SS-14	May 25/72			INSUFFICIENT FLOW		
	August 21/72			INSUFFICIENT FLOW		
SS-15	May 25/72			NO FLOW		
	August 21/72			NO FLOW		
SS-16	May 25/72			NO FLOW		
	August 21/72			NO FLOW		
SS-17	June 6/72			NO FLOW		
	August 21/72			NO FLOW		
SS-18	June 6/72	0.4	L 1	-	3,500	530
	August 21/72	0.2	0	-	7,300	1,200
SS-19	May 25/72	0.6	5	2	16	4
	August 21/72			NO FLOW		
SS-20	May 25/72	1.2	10	2	252	44
	August 21/72			NO FLOW		
SS-21	May 25/72			NO FLOW		
	August 21/72			NO FLOW		

SAMPLE PT. NO.	DATE SAMPLED	BOD (mg/l)	SUSPENDED SOLIDS (mg/l)	PHENOLS (ppb)	TOTAL COLIFORMS per 100 ml	FECAL COLIFORMS per 100 ml
SS-22	May 25/72			NO FLOW		
	August 21/72			NO FLOW		
SS-23	May 25/72			NO FLOW		
	August 21/72			NO FLOW		
SS-24	May 25/72			NO FLOW		
	August 21/72			NO FLOW		
SS-25	June 19/72			NO FLOW		
	August 21/72			NO FLOW		
SS-26	June 6/72			NO FLOW		
	August 21/72			NO FLOW		
SS-27	June 6/72			NO FLOW		
	August 21/72			NO FLOW		
SS-28	May 25/72			INSUFFICIENT FLOW		
	August 21/72			INSUFFICIENT FLOW		
SS-29	June 6/72			INSUFFICIENT FLOW		
	August 21/72			INSUFFICIENT FLOW		
SS-30	May 26/72	0.4	5	6	L 10	L 10
	August 21/72	0.4	0	-	L 10	L 10
SS-31	May 26/72	0.4	5	2	30	L 10
	August 21/72	0.6	0	-	300	50
SS-32	May 25/72	1.6	10	2	330	60
	August 21/72			INSUFFICIENT FLOW		
SS-33	May 26/72			INSUFFICIENT FLOW		
	August 21/72			INSUFFICIENT FLOW		
SS-34	June 6/72			NO FLOW		
	August 21/72			NO FLOW		

SAMPLE PT. NO.	DATE SAMPLED	BOD (mg/l)	SUSPENDED SOLIDS (mg/l)	PHENOLS (ppb)	TOTAL COLIFORMS per 100 ml	FECAL COLIFORMS per 100 ml
SS-35	June 6/72			N O F L O W		
	August 21/72			N O F L O W		
SS-36	May 26/72	2.5	10	2	5,000	60
	June 6/72	1.8	-	-	L 10	L 10
	August 21/72	2.0	0	-	L 10	L 10
SS-37	May 26/72			N O F L O W		
	August 21/72			N O F L O W		

TABLE III

TOWN OF GEORGETOWN

ENVIRONMENT ONTARIO WATER POLLUTION CONTROL PLANT RECORDS - 1971

MONTH	FLOW (GPD)				CHLORINE	
	TOTAL	MAX. DAY	MAX. RATE	AVG. DAY	LBS.	DOSAGE mg/l
January	45,180,000	1,950,000	4,000,000	1,460,000	1,242	2.8
February	48,000,000	2,820,000	4,500,000	1,710,000	1,125	2.3
March	64,000,000	2,100,000	4,500,000	1,980,000	1,501	2.3
April	58,300,000	3,200,000	3,700,000	1,900,000	1,624	2.5
May	40,900,000	2,100,000	3,400,000	1,600,000	1,541	3.4
June	48,300,000	2,200,000	3,700,000	1,600,000	1,511	3.6
July	47,400,000	2,300,000	3,600,000	1,200,000	2,234	4.3
August	39,000,000	1,700,000	3,300,000	1,200,000	1,482	3.3
September	37,900,000	1,600,000	2,700,000	1,300,000	1,507	3.4
October	36,200,000	1,400,000	2,700,000	1,200,000	1,585	4.1
November	35,930,000	1,440,000	3,400,000	1,200,000	1,649	4.2
December	42,280,000	2,400,000	2,700,000	1,360,000	1,895	4.2
TOTAL	552,390,000				18,896	Avg. 3.2
MAXIMUM DAY		3,200,000				
AVERAGE DAY				1,513,397		

TABLE III

TOWN OF GEORGETOWN

ENVIRONMENT ONTARIO WATER POLLUTION CONTROL PLANT RECORDS - 1972

MONTH	FLOW (GPD)				CHLORINE	
	TOTAL	MAX. DAY	MAX. RATE	AVG. DAY	LBS.	DOSAGE mg/l
January	43,220,000	1,710,000	2,300,000	1,390,000	1,746	2.4
February	39,660,000	1,770,000	2,700,000	1,370,000	1,601	4.1
March	50,550,000	2,130,000	3,300,000	1,630,000	1,679	3.2
April	60,320,000	2,490,000	3,300,000	2,010,000	1,630	2.4

The flow meter at the sewage treatment plant was out of operation from mid-May to mid-September.

TABLE IV

TOWN OF GEORGETOWN

WATER WORKS RECORDS - 1971

MONTH	PUMPAGES (Gals.)				CHLORINE	
	TOTAL	MAX. DAY	MIN. DAY	AVG. DAY	LBS.	DOSAGE mg/l
January	42,950,000	1,868,000	849,000	1,385,483	77	0.2
February	39,891,000	2,057,000	919,000	1,385,035	86	0.2
March	45,693,000	1,928,000	923,000	1,473,976	148	0.3
April	45,512,000	2,004,000	927,000	1,517,066	124	0.3
May	52,824,000	2,332,000	1,334,000	1,704,000	149	0.3
June	54,808,000	2,755,000	1,115,000	1,826,933	177	0.3
July	47,827,000	2,557,000	942,000	1,542,806	228	0.5
August	50,370,000	2,740,000	986,000	1,624,838	204	0.4
September	46,625,000	1,976,000	964,000	1,554,166	155	0.3
October	43,879,000	1,834,000	741,000	1,415,451	133	0.3
November	43,970,000	2,206,000	976,000	1,465,666	155	0.4
December	44,949,000	1,964,000	978,000	1,449,967	172	0.4
TOTAL	559,298,000				1,808	Avg. 0.3
MAXIMUM DAY		2,740,000				
MINIMUM DAY			741,000			
AVERAGE DAY				1,532,323		

TABLE IV

TOWN OF GEORGETOWN

WATER WORKS RECORDS - 1972

MONTH	PUMPAGES (Gals.)				CHLORINE	
	TOTAL	MAX. DAY	MIN. DAY	AVG. DAY	LBS.	DOSAGE mg/l
January	44,724,000	2,147,000	976,000	1,442,709	165	0.4
February	40,259,000	1,656,000	908,000	1,388,241	146	0.4
March	42,379,000	1,635,000	877,000	1,367,064	171	0.4
April	42,000,000	1,864,000	848,000	1,400,000	256	0.6
May	53,138,000	2,564,000	1,055,000	1,714,129	290	0.5
June	53,524,000	2,727,000	1,130,000	1,784,150	234	0.4
July	52,245,000	2,208,000	987,000	1,685,322	256	0.5
August	50,590,000	2,126,000	1,052,000	1,631,935	237	0.5
September	48,333,000	2,256,000	1,153,000	1,611,000	228	0.5
TOTAL	427,192,000					
AVERAGE DAY				1,564,805		

TABLE V

TOWN OF GEORGETOWN

WATER POLLUTION CONTROL PLANT

BOD & SUSPENDED SOLIDS ANALYSES - 1971
Regular Submissions

DATE	BOD (mg/l)		SUSPENDED SOLIDS (mg/l)	
	Raw	Final	Raw	Final
Jan. 12	95	11	166	10
Jan. 26	130	12	200	15
Feb. 9	160	20	310	10
Feb. 23	70	9	180	15
Mar. 18	95	13	110	30
Apr. 7	95	45	90	35
Apr. 20	90	17	160	20
May 18	120	16	210	20
June 1	130	30	140	40
June 3	80	-	110	-
June 4	65	-	90	-
June 8	110	-	190	-
June 9	110	-	150	-
June 10	100	-	120	-
June 11	80	-	140	-
June 15	90	16	170	20
June 16	65	-	120	-
June 17	130	-	150	-
June 18	55	-	120	-
June 22	65	-	80	-

DATE	BOD (mg/l)		SUSPENDED SOLIDS (mg/l)	
	Raw	Final	Raw	Final
June 23	95	-	80	-
June 23	95	-	380	-
June 29	70	34	150	10
July 27	110	20	160	10
Aug. 24	106	40	160	10
Sept. 1	140	9	130	5
Sept. 7	130	40	190	5
Sept. 21	100	13	350	5
Oct. 5	120	28	170	20
Oct. 19	160	20	230	30
Nov. 2	130	28	230	14
Nov. 16	110	28	260	5
Nov. 30	160	20	270	10
Dec. 14	110	34	190	5
Average	105	23	177	15

TABLE V

TOWN OF GEORGETOWN

WATER POLLUTION CONTROL PLANT

BOD & SUSPENDED SOLIDS ANALYSES - 1972

DATE	BOD (mg/l)		SUSPENDED SOLIDS (mg/l)	
	Raw	Final	Raw	Final
Jan. 11	160	44	225	10
Feb. 1	120	32	240	5
Feb. 8	150	65	210	20
Feb. 22	130	50	210	20
Mar. 7	110	40	280	10
Mar. 21	150	80	170	30
Apr. 4	80	22	150	10
May 30	100	90	240	15
June 13	95	38	350	60
June 27	110	12	160	20
July 25	90	30	180	10
Aug. 8	110	6	170	10
Aug. 22	90	20	190	5
Sept. 5	140	G 32	230	30
	116	34	214	18

TABLE VI

TOWN OF GEORGETOWN

WATER POLLUTION CONTROL PLANT

BOD & SUSPENDED SOLIDS ANALYSES - PROJECT OPERATIONS RESULTS

MONTH	RAW SEWAGE		FINAL EFFLUENT	
	BOD (mg/l)	SS (mg/l)	BOD (mg/l)	SS (mg/l)
1971				
January	112	210	12	24
February	115	284	14	16
March	95	183	13	17
April	90	152	17	63
May	120	285	16	67
June	73	176	27	25
July	110	220	20	13
August	100	206	40	10
September	115	323	27	10
October	140	258	24	34
November	133	317	25	19
December	110	254	34	12
Average	109	237	22	25
1972				
January	160	239	44	10
February	133	246	49	11
March	130	241	60	18
April	80	167	22	27
May	100	240	9	15
June	95	350	38	60
July	90	180	30	10
August	110	170	6	10
Average	112	229	32	20

TABLE VII

TOWN OF GEORGETOWN - WATER WORKS

HEAVY METALS ANALYSIS

METAL	CONCENTRATION (Mg/l)
Chromium, Cr	0.02
Zinc, Zn	0.74
Copper, Cu	0.31
Nickel, Ni	*L 0.07
Lead, Pb	*L 0.12
Cadmium, Cd	*L 0.02
Manganese, MN	*L 0.04
Silver, Ag	*L 0.03
Cyanide, Cn	*L 0.01

*L = less than

GLOSSARY OF TERMS

BIOCHEMICAL OXYGEN DEMAND (BOD) - Most frequent damage caused by the discharge of wastes to natural waters, next only to bacterial contamination is the reduction of dissolved oxygen concentrations to levels which cannot support normal aquatic life. The resulting kills are accompanied by deterioration of water quality for all uses and dissolved oxygen is depleted through oxidation of the organic content of the wastes and by bacteria (occasionally by direct chemical oxidation). BOD tests are a measure of the amount of dissolved oxygen required for the process of stabilization of the decomposable organic matter by aerobic bacterial action and specific length of time (five days) under standard conditions (20° in the dark).

CMP - CORROGATED METAL PIPE

COLIFORM BACTERIA - Coliform bacteria are inhabitants of the intestines of man and other warm blooded animals and are present in human sewage in extremely high numbers. In addition some species of coliform bacteria can be found in soil and decaying vegetation.

FAECAL COLIFORMS - As implied are of faecal origin and their presence in significant quantity denotes recent contact with human or animal wastes.

OUTFALL - The outlet or mouth of a river, dam, sewer, etc. where it discharges to a lake, river, stream, etc.

pH - is a mesure of the hydrogen ion concentration in water. Specifically it is the negative logarithm of the free hydrogen ion concentration expressed in moles per litre. Thus, each change of 1 unit in pH corresponds to a 10

fold hydrogen ion concentration change. Neutral solutions have a hydrogen ion concentration of 10^{-7} moles per liture. Therefore, pH is seven.

pH does not measure the total amount of acidity or alkalinity in the water since some may be in a combined form and, therefore, will not be included in the pH measurement of free hydrogen ions. The combined forms can still be released to react with bases. The commonest example in water is a bicarbonate ion which can react with acids to form carbonic acids or with bases to form carbonates.

PHENOLIC COMPOUNDS - Phenols are hydroxy derivatives of benzene and its condensed nuculei. They are usually present in surface water as a result of contact with petroleum products.

POLLUTE - To introduce or release into a receiving water substances of such volume and character that the natural quality of the water is altered so as to reduce its usefulness or render it offensive to sight, taste or smell.

SANITARY SEWER - A sewer intended to carry domestic and industrial wastes only.

STORM SEWERS - A sewer intended to carry storm wastes and relatively unpolluted discharges only (ie. cooling waters).

PHOSPHORUS AS P

Soluble Phosphorus - The soluble phosphorus content of a sample is that fraction which will pass through a filter and will react chemically through the agents used to determine the concentration of orthophosphate yielding a positive test response.

It is generally accepted that organic and even particulate forms can react similarly to orthophosphate and for this reason the results are often referred to as soluble reactive phosphorus which removes the implication that the test measures only orthophosphate.

The meaning of this parameter has been left in some doubt by a number of researchers (Rigler and Fitzgerald) they have shown that:

a. Particulate matter which can pass through pore sizes of 0.22 microns to alter the result (this laboratory has been unable to confirm this finding for Great Lakes samples);
b. the soluble phosphorus concentration can change rapidly with time after collection unless adequately preserved.

Anyone making conclusions based on soluble phosphorus results should be acquanited with the various interpretations made by such results.

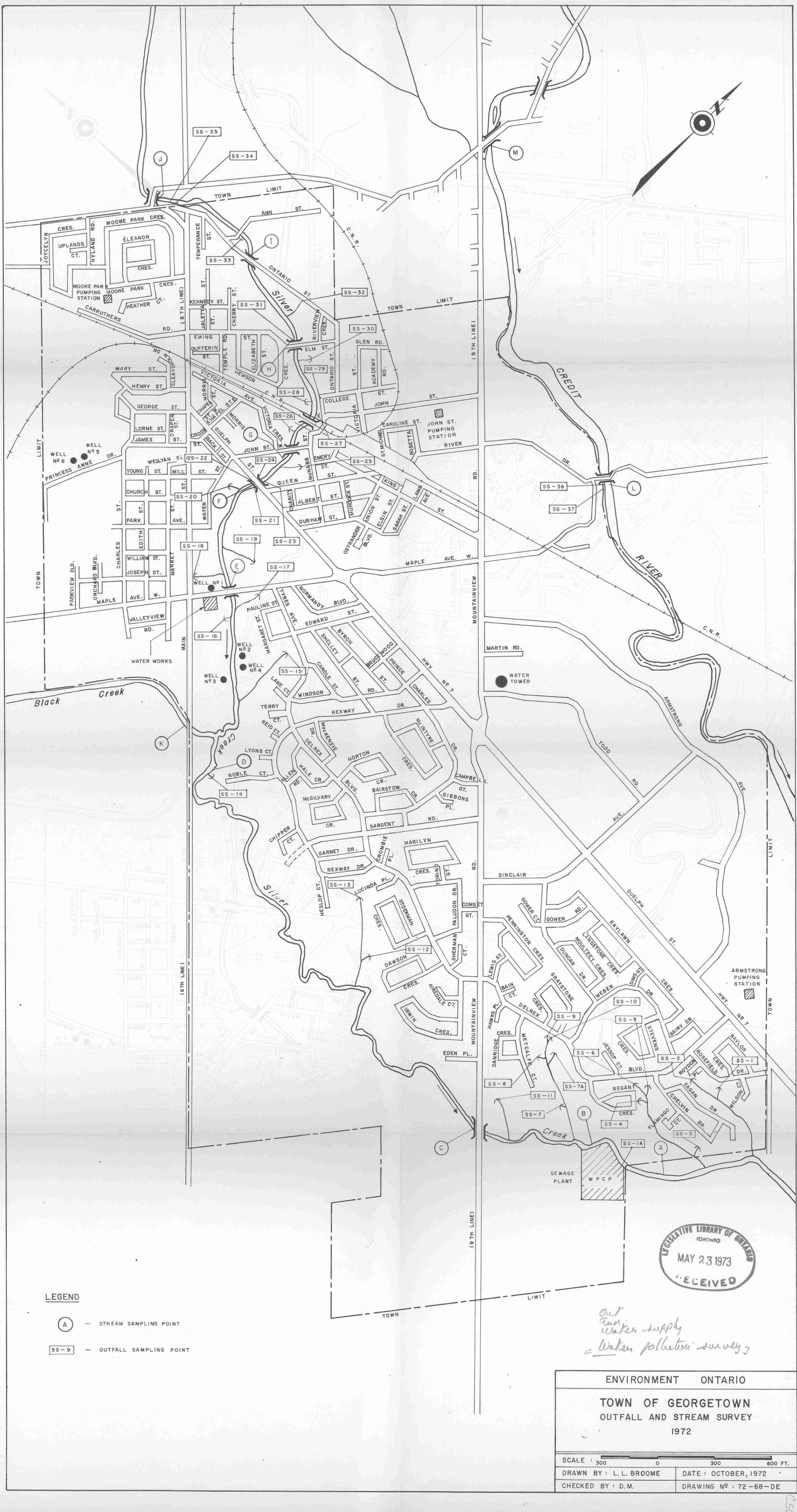
TOTAL PHOSPHORUS - Phosphorus is an essential plant nutrient and is believed to play an important role in the deterioration of the quality in natural waterways by promoting an over abundance of plants. It occurs in nature and wastewaters in several different chemical combinations such as orthophosphate (PO_4), organic phosphates and polyphosphates. Since most or all of these forms can eventually be used by plants and animals determination of the total phosphorus concentration is more relevant than the measurement of individual phosphorus compounds.

SOLIDS - Measurement by total, suspended and dissolved solids concentrations are traditional tests. An estimate of the organic fraction for the solids

and of the organic content of sediments is obtained by heating the samples to 600°C in a furnace to burn off the combustible matter.

The suspended solids concentration relates to the turbidity, and the dissolved solids concentration affects the specific conductivity, although there are no common factors for converting one to the other in all cases. A numerical relationship cannot be obtained for a given area or type of water. Ontario rivers, free of industrial wastes have a dissolved solids concentration of 0.65 $\pm$ 0.10 times the specific conductivity. The dissolved solids by weight concentration test has been largely superceded by the more accurate conductivity measurement.

GEORGETOWN



LEGEND

(A) — STREAM SAMPLING POINT

SS-9 — OUTFALL SAMPLING POINT

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TOWN OF GEORGETOWN

OUTFALL AND STREAM SURVEY

1972

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CHECKED BY : D.M.	DRAWING Nº : 72-68-DE

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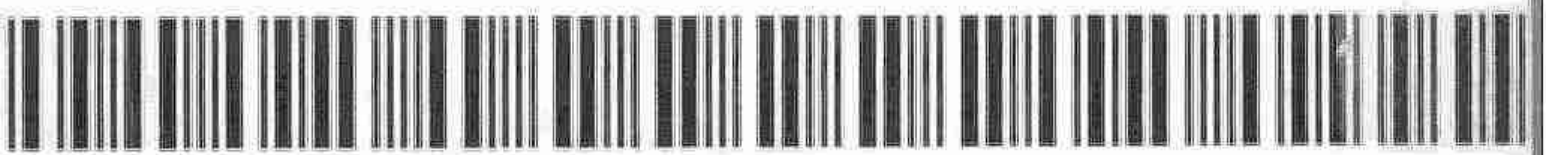
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